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ABSTRACT

This seventh in a series of twenty-nine learning modules on instructional execution is designed to give secondary and postsecondary vocational teachers skill in assisting student development of laboratory work plans, in guiding student progress through the use of these plans, and in developing special instructional materials for use in the laboratory, such as job sheets, operation sheets, and information sheets. Introductory sections relate the competencies dealt with here to others in the program and list both the enabling objectives for the three learning experiences and the resources required. Materials in the learning experiences include required reading, self-check quizzes, model answers, performance checklists, case studies to critique, model critiques and the teacher performance assessment form for use in evaluation of the terminal objective. (The modules on instructional execution are part of a larger series of 100 field-tested performance-based teacher education (PBTE) self-contained learning packages for use in preservice or inservice training of teachers in all occupational areas. Materials are designed for use by teachers, either on an individual or group basis, working under the direction of one or more resource persons/instructors.) (BM)

ED149071

MODULE

C-7

Direct Student Laboratory Experience

MODULE C-7 OF CATEGORY C—INSTRUCTIONAL EXECUTION
PROFESSIONAL TEACHER EDUCATION MODULE SERIES

The Center for Vocational Education

The Ohio State University

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U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE NATIONAL INSTITUTE OF EDUCATION

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FOREWORD

This module is one of a series of 100 performance-based teacher education (PBTE) learning packages focusing upon specific professional competencies of vocational teachers. The competencies upon which these modules are based were identified and verified through research as being important to successful vocational teaching at both the secondary and post-secondary levels of instruction. The modules are suitable for the preparation of teachers in all occupational areas.

Each module provides learning experiences that integrate theory and application; each culminates with criterion referenced assessment of the teacher's performance of the specified competency. The materials are designed for use by individual or groups of teachers in training working under the direction and with the assistance of teacher educators acting as resource persons. Resource persons should be skilled in the teacher competency being developed and should be thoroughly oriented to PBTE concepts and procedures in using these materials.

The design of the materials provides considerable flexibility for planning and conducting performance-based preservice and inservice teacher preparation programs to meet a wide variety of individual needs and interests. The materials are intended for use by universities and colleges, state departments of education, post-secondary institutions, local education agencies, and others responsible for the professional development of vocational teachers. Further information about the use of the modules in teacher education programs is contained in three related documents: **Student Guide to Using Performance-Based Teacher Education Materials, Resource Person Guide to Using Performance-Based Teacher Education Materials** and **Guide to Implementation of Performance-Based Teacher Education.**

The PBTE curriculum packages are products of a sustained research and development effort by The Center's Program for Professional Development for Vocational Education. Many individuals, institutions, and agencies participated with The Center and have made contributions to the systematic development, testing, revision, and refinement of these very significant training materials. Over 40 teacher educators provided input in development of initial versions of the modules; over 2,000 teachers and 300 resource persons in 20 universities, colleges, and post-secondary institutions used the materials and provided feedback to The Center for revision and refinement.

Special recognition for major individual roles in the direction, development, coordination of testing, revision, and refinement of these materials is extended to the following program staff: James B. Hamilton, Program Director; Robert E. Norton, Associate Program Director; Glen E. Fardig, Specialist; Lois Harrington, Program Assistant; and Karen Quinn, Program Assistant. Recognition is also extended to Kristy Ross, Technical Assistant; Joan Jones, Technical Assistant; and Jean Wisenbaugh, Artist for their contributions to the final refinement of the materials. Contributions made by former program staff toward developmental versions of these materials are also acknowledged. Calvin J. Cotrell directed the vocational teacher competency research studies upon which these modules are based and also directed the curriculum development effort from 1971–1972. Curtis R. Finch provided leadership for the program from 1972–1974.

Appreciation is also extended to all those outside The Center (consultants, field site coordinators, teacher educators, teachers, and others) who contributed so generously in various phases of the total effort. Early versions of the materials were developed by The Center in cooperation with the vocational teacher education faculties at Oregon State University and at the University of Missouri-Columbia. Preliminary testing of the materials was conducted at Oregon State University, Temple University, and University of Missouri-Columbia.

Following preliminary testing, major revision of all materials was performed by Center Staff with the assistance of numerous consultants and visiting scholars from throughout the country.

Advanced testing of the materials was carried out with assistance of the vocational teacher educators and students of Central Washington State College; Colorado State University; Ferris State College, Michigan, Florida State University; Holland College, P.E.I., Canada; Oklahoma State University; Rutgers University; State University College at Buffalo; Temple University; University of Arizona; University of Michigan-Flint; University of Minnesota-Twin Cities; University of Nebraska-Lincoln; University of Northern Colorado; University of Pittsburgh; University of Tennessee; University of Vermont; and Utah State University.

The Center is grateful to the National Institute of Education for sponsorship of this PBTE curriculum development effort from 1972 through its completion. Appreciation is extended to the Bureau of Occupational and Adult Education of the U.S. Office of Education for their sponsorship of training and advanced testing of the materials at 10 sites under provisions of EPDA Part F, Section 553. Recognition of funding support of the advanced testing effort is also extended to Ferris State College, Holland College, Temple University, and the University of Michigan-Flint.

Robert E. Taylor
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THE CENTER FOR VOCATIONAL EDUCATION
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The Center for Vocational Education's mission is to increase the ability of diverse agencies, institutions, and organizations to solve educational problems relating to individual career planning and preparation. The Center fulfills its mission by:

- Generating knowledge through research.
- Developing educational programs and products.
- Evaluating individual program needs and outcomes.
- Installing educational programs and products.
- Operating information systems and services.
- Conducting leadership development and training programs.

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The American Association for Vocational Instructional Materials (AAVIM) is an interstate organization of universities, colleges and divisions of vocational education devoted to the improvement of teaching through better information and teaching aids.

INTRODUCTION

In the vocational laboratory, students learn by doing, getting concrete "hands-on" experience in their vocational area. One of your responsibilities as a vocational teacher will be to direct and supervise these experiences.[1] In the typical laboratory, it is neither possible nor desirable to try to keep students progressing at the same rate or working on the same activities.

For one thing, the availability of laboratory equipment usually limits the number of students who can participate in a given activity at one time. Therefore, a vocational teacher must have the ability to direct students in making maximum use of laboratory equipment. More important, however, students differ in their abilities, interests, needs, and learning styles. Thus, the teacher must be able to plan for these differences and guide students who are not all at the same stage of learning at the same time.

Successful supervision of laboratory work demands a skillful and well-prepared teacher. This module is designed to prepare you to effectively guide students during laboratory instruction. Experiences are provided to aid you in assisting students in developing their own work plans and guiding their progress through the use of these plans.

Other experiences are designed to give you skill in developing special instructional materials for use in the laboratory: job sheets, operation sheets, and information sheets. These plans and materials are not all commonly used in all service areas, although all certainly could be. Therefore, you and your resource person may wish to select those learning experiences which have the most application to your area.

1. To gain skill in organizing and managing the physical aspects of the vocational laboratory, you may wish to refer to Module E-8, *Organize the Vocational Laboratory*, and Module E-9, *Manage the Vocational Laboratory*.

ABOUT THIS MODULE

Objectives

Terminal Objective: In an actual school situation, direct student laboratory experience. Your performance will be assessed by your resource person, using the Teacher Performance Assessment Form, pp. 53–54 (*Learning Experience VII*).

Enabling Objectives:

1. After completing the required reading, demonstrate knowledge of the procedures involved in directing student laboratory experience (*Learning Experience I*).
2. After completing the required reading, develop a job sheet to guide student progress in the laboratory (*Learning Experience II*).
3. After completing the required reading, develop an operation sheet to guide student progress in completing a job (*Learning Experience III*).
4. After completing the required reading, develop an information sheet to provide students with information relating to planned laboratory experience (*Learning Experience IV*).
5. After completing the required reading, critique the performance of the teacher in a given case study in directing students in developing work plans (*Learning Experience V*).
6. Given a case study of a teacher directing student laboratory experience, critique the performance of that teacher (*Learning Experience VI*).

Prerequisites

To complete this module, you must have competency in developing a lesson plan. If you do not already have this competency, meet with your resource person to determine what method you will use to gain this skill. One option is to complete the information and practice activities in the following module:

- *Develop a Lesson Plan*, Module B–4

Resources

A list of the outside resources which supplement those contained within the module follows. Check with your resource person (1) to determine the availability and the location of these resources, (2) to locate additional references in your occupational specialty, and (3) to get assistance in setting up activities with peers or observations of skilled teachers, if necessary. Your resource person may also be contacted if you have any difficulty with directions, or in assessing your progress at any time.

Learning Experience I

No outside resources

Learning Experience II

No outside resources

Learning Experience III

No outside resources

Learning Experience IV

No outside resources

Learning Experience V

Optional

Reference: Giachino, J. W. and Ralph O. Gallington. *Course Construction in Industrial Arts, Vocational and Technical Education.* Third Edition. Chicago, IL: American Technical Society, 1967.

Learning Experience VI

Optional

A teacher experienced in directing student laboratory experience whom you can observe

Learning Experience VII

Required

An actual school situation in which you can direct student laboratory experience.

A resource person to assess your competency in directing student laboratory experience.

This module covers performance element numbers 87, 93, 94 from Calvin J. Cotrell *et al.*, *Model Curricula for Vocational and Technical Education: Report No. V* (Columbus, OH: The Center for Vocational Education, The Ohio State University, 1972). The 384 elements in this document form the research base for all The Center's PBTE module development.

For information about the general organization of each module, general procedures for their use, and terminology which is common to all 100 modules, see About Using The Center's PBTE Modules on the inside back cover.

Learning Experience I

OVERVIEW

After completing the required reading, demonstrate knowledge of the procedures involved in directing student laboratory experience.

You will be reading the information sheet, Directing Student Laboratory Experience, pp. 6–11.

You will be demonstrating knowledge of the procedures involved in directing student laboratory experience by completing the Self-Check, pp. 12–14.

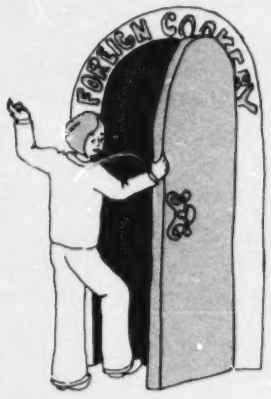
You will be evaluating your competency by comparing your completed Self-Check with the Model Answers, p. 15.

Activity

This information sheet describes the responsibilities of a vocational teacher who is working with students in the laboratory or shop. Read this information sheet to learn how teachers can use specially developed methods and materials to help them manage a complex teaching situation.

DIRECTING STUDENT LABORATORY EXPERIENCE

Suppose we make an imaginary visit to a class in commercial food preparation in which the teacher is working in a unit on foreign cookery. The



teacher developed one laboratory lesson on the preparation of a Japanese dish, beef sukiyaki, and discussed the preparation of this dish with the students. The teacher listed the necessary ingredients, described the general procedure, noted the special utensils needed, and demonstrated some of the key operations. At the time of our visit, the students are ready to attempt to prepare the dish themselves in the laboratory, and the teacher must direct and supervise them.

The work tables are clean and ready for use, the various ingredients are available, the utensils are hanging on their respective racks, and all the kitchen equipment is in working order. As the students go about their task, it is apparent that they differ in their cooking experience, their skill in performing the operations, and the rate at which they work. The teacher prepared for these differences (1) by providing the students with helpful written materials and (2) by conducting the laboratory session so that each student gets the kind of assistance he/she needs in order to successfully prepare sukiyaki.

Since there was nothing about Japanese cooking in the textbook, the teacher prepared an information sheet on the topic and gave copies to the class. This information sheet served as a basis for class discussion and will also provide the students with reference material for their notebooks. In addition to oral instruction, the teacher furnished each student with a written recipe which lists ingredients, utensils, and procedures. With this detailed instruction sheet before them, the students are now working individually and at their own pace—the more skilled students doing the job smoothly and quickly, the slower ones getting reminders and help from the teacher as they run into trouble.

This particular instruction sheet goes into considerable detail because the teacher wants the students to learn a very specific job. However, in other lessons (such as planning a menu) the students were given more opportunity to solve the problem creatively. This teacher often furnishes instruction sheets for operations that will occur frequently in the course of food preparation. By referring to such sheets, students can remind themselves of the special techniques required and can move ahead without the teacher's help.

In the laboratory, the teacher is circulating among the work stations, working with individual students and small groups as the students go about their tasks. Some students are given just a nod and a smile of reassurance, some get a few words of instruction or advice. At one or two work stations the teacher stops to correct a student's faulty technique or to perform a brief demonstration. As the teacher moves about to make suggestions, praise efforts, relieve anxieties, correct errors, solve problems, and lend a bit of assistance, the students use the written plans and instructions to guide themselves.

Your Responsibilities

The laboratory activity that you have just reviewed is an example, described in simple terms, of a teacher in the process of "directing student laboratory experience." The process will, of course, vary a great deal in complexity, sequence, and content between laboratories and from one teaching situation to another. The occupational service area, subject matter, student abilities, and available facilities will all affect the way in which the laboratory experience is organized. There are, however, the following basic responsibilities common to all vocational teachers in supervising students in the laboratory.

Providing Facilities, Materials, and Equipment

In order for students to have successful laboratory experiences, they must, of course, have all the materials, supplies, tools, and equipment needed to perform the assigned task. A home economics student, for example, cannot be expected to successfully prepare a pie crust if his or her classmates used up the last of the flour. Similarly, a student in a welding lab will have difficulty making a weld if all but one welding torch is out of order, and three people are waiting to use that one.

Thus, you must ensure that you have the items required and in sufficient amounts for all students to complete their various tasks. Additionally, you need to have the proper facilities. You may not have much control over which room you are assigned to use. Ideally, however, the laboratory should be neat, clean, well-organized, and consistent with conditions on the job.

Providing Instruction

Before students can be expected to perform an operation or job on their own, they need some form of instruction in the skills required for successful (and safe) performance. You can provide this instruction through such methods as illustrated talks, demonstrations, or printed instructional materials designed by the teacher or duplicated from other sources which are appropriate to the teaching/learning situation.

In many cases, a combination of these methods is most effective. You could start by verbally explaining what is to be done using appropriate illustrations. You could then demonstrate the skill—performing the whole task, or demonstrating various smaller operations required. Then, before the students attempt the task themselves, you could equip them with written instructions to guide their work.

Providing for Student Involvement

Laboratory work would seem, by its nature, to involve active student participation. However, teachers sometimes direct the activity very closely and student involvement is limited to simply mimicking a demonstration or following detailed teacher-made instructions. Whenever possible, students should be involved in group discussion, individual job planning, laboratory management, creative problem-solving, and even instructing.

A group of students who successfully complete the laboratory work early can share their results in a discussion, use what they have learned to design an experiment of their own, or work with slower students. All students should be actively involved in managing and maintaining their own work stations and equipment. Through this, they can learn organizational and maintenance skills they will be expected to have when they are on the job in the real world.

Providing Resource Materials

The resources students will need in the laboratory go beyond just the minimum equipment and material required for the task at hand. To ensure that students with different interests and abilities (especially reading ability) have the resources necessary to pursue the subject as deeply as their needs and interests dictate, you must provide relevant and current books, pamphlets, plans, documents, regulations, periodicals, and audiovisual materials to support the topic.

Providing Opportunities for Feedback

To minimize the possibility of error and confusion, you should encourage students to ask questions before, during, and after the laboratory work. After an illustrated talk, you could have a planned question-and-answer period. Based on students' responses to your questions and on the questions they raise themselves, you will be able to determine if they have understood what they are to do, and if they seem ready to move into the laboratory.

During the laboratory work, you should be available to answer questions as they arise. If you have students who have successfully completed the laboratory work, they could also handle some student questions. Feedback is especially important if

students are developing their own work plans. Before any student starts to act on what he or she has planned, you need to carefully check each plan for completeness, accuracy, and practicality.

Providing Assistance in the Laboratory

In addition to being available to answer questions, you will need to actively assist students in the laboratory in other ways. Students should not be left alone to pursue their tasks even if they are supremely capable and well-provided with excellent instruction sheets. You need to circulate amongst them—advising, suggesting, correcting, aiding, demonstrating, reminding, and directing as is required.

Above all, you need to reinforce—giving praise for work well done, letting the student know you see improvement, showing appreciation for a particularly good effort. The laboratory environment provides an excellent opportunity for this kind of personal contact.

Providing for Evaluation

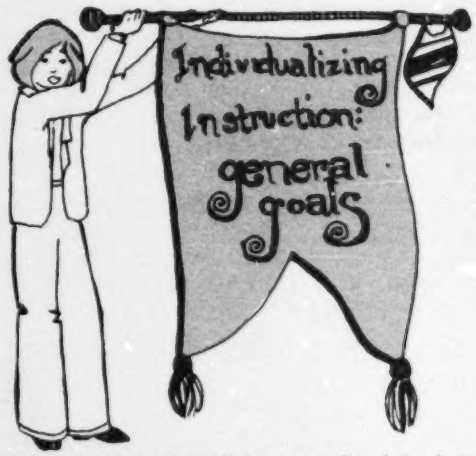
In order for students to learn from their efforts, and for you to maintain the desired quality and quantity of laboratory work, you need to provide students with feedback on their performances and products. Ultimately, of course, some type of formal objective evaluation is needed to ensure that objectives have been successfully achieved, but much informal evaluation can be done during the lab period.

The teacher can constantly make quick checks of each student's job and give short evaluations of the work. Students can be told if the job is within specified size tolerances, if the quality of finish is satisfactory, where a recurring mistake is being made, whether their speed is up to occupational expectations, and so on. This kind of continuous evaluation of performance must not, however, be allowed to degenerate into constant criticism or nagging. It must be done in such a way that students see it as constructive feedback that will help them improve their work.

Providing for Individualization[2]

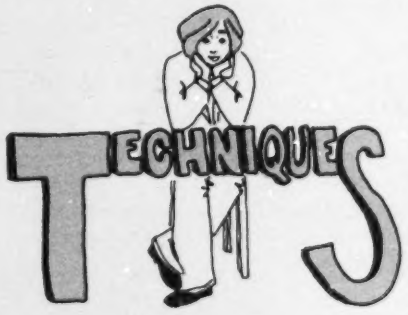
In any student group working in the laboratory, there are probably no two individuals who are exactly alike in the rate at which they work, their physical coordination, their interests, or their capacity to learn. Teaching methods which require the same activity from all students at the same time are typically directed at the average student, and may miss almost entirely the ambitious students and the slow students. In directing the laboratory experience, you will need to be aware of student differences and be prepared to deal with them.[3] The properly organized and managed vocational laboratory can allow you a special opportunity to meet individual student needs.

The following are some general goals for individualizing instruction in the vocational laboratory:



- Each student should be permitted to learn new skills or knowledge at the time he or she is **ready**, without regard to the stage of progress others are at.
- Each student should be allowed to learn at his or her **own rate**, regardless of how rapidly others are progressing.
- Each student should be given the amount of **teacher assistance** he or she needs.

Good teachers ultimately develop personal teaching styles, including how they relate to individual students. There are, however, some tech-



2. Adapted from Gerald B. Leighbody and Donald M. Kidd, *Methods of Teaching Shop and Technical Subjects* (Albany, NY: Delmar Publishers, Inc., 1968), pp. 160, 161, 163.

3. To gain skill in recognizing and gearing your instruction to students' individual differences, you may wish to refer to Module B–1, *Determine Needs and Interests of Students*, or Module C–18, *Individualize Instruction*.

niques that you should try out in your effort to individualize work in the laboratory.

- Modify the job slightly for individual students, giving the capable student a more challenging task, or slanting the work toward a special interest.
- Deliberately vary the kind of instructional assistance according to individual needs. Give partial answers, or simply ask questions of the student who can be stimulated to follow through independently. You may even refuse, at least temporarily, to answer some questions in order to provoke individual initiative.
- For those students who have trouble grasping abstract ideas, teach with examples or analogies.
- Give very brief "mini-demonstrations" to students who need to be reminded of a skill.
- Relate the present laboratory work to students' experiences. Remind students of their previously successful performances or of an error that can be avoided.
- Develop the habit of visiting every student's work station at least once during each laboratory session, even if only to provide brief reinforcement for good work.

Instruction Sheets

One effective way to individualize instruction in the vocational laboratory is to develop instruction sheets for the students to use. The term "Instruction Sheet" is a general term for all kinds of typewritten, printed, mimeographed, or duplicated instructional aids. An instruction sheet may be a single sheet or several pages long, and may be teacher-prepared, furnished by the school system, or even obtained from commercial publishers or industrial sources. Instruction sheets generally are designed to supplement the teacher's oral and visual instruction with printed instruction.

Just as a lesson plan guides the teacher in presenting a lesson, so the instruction sheet is a guide for the student's use in learning. It should be a completely prepared lesson of some kind, intended to aid self-instruction, and containing only necessary information and directions. The language, reading level, and overall approach should be adapted to that of the student who is going to use it.

Properly used, instruction sheets can contribute greatly toward making the vocational laboratory period an effective learning experience. In a situation in which students are working at a number of jobs or at a range of ability levels, well-prepared sheets can help you maintain control of all this diversity. You can then fulfill your primary function of personally guiding student learning.

Instruction sheets can economize your time by reducing the need for you to re-explain or repeat directions. Through their use, instruction on new processes and techniques, and new relevant information can be incorporated into the course of study quite readily.

By furnishing clear and explicit instruction that can be referred to as the need arises, instruction sheets allow students to avoid costly errors and progress at a rate which is comfortable for them. Students who finish quickly and efficiently can move more rapidly to new and challenging tasks. Slower students can do the work they need without getting left behind and lost. All students have a chance to develop their ability to follow written instructions and to organize their work efficiently. Attractive, well-illustrated instruction sheets can be good motivating forces for quality laboratory work.

Instruction sheets have their limitations, however, and it is possible to misuse or overuse them. Instruction sheets do not eliminate the need for active teaching in the laboratory. Nor should the same materials be used over and over again, year after year, long after they have outlived their usefulness. Additionally, if the written instructions are too detailed, the opportunity for student problem-solving and creative initiative may be largely lost. Instruction sheets are not intended to replace teacher instruction and demonstration or reduce personal contact between teacher and student.

There are a number of types of instruction sheets,[4] each with its own purpose, characteristics, and use in the laboratory. The terminology can be confusing. The following are some of the more frequently used types of instruction sheets:

- **Job Sheet.**—This form of instruction sheet is designed to give instructions and specifications for doing a complete piece of work (a job). It may include detailed directions in verbal form and/or consist of a working drawing. (Example: "Produce 100 copies of a

4. Material on the various types of instruction sheets is adapted from Louis Cenci and Gilbert G. Weaver, *Teaching Occupational Skills*, Second Edition (Belmont, CA: Pitman Publishing Corporation, 1968), pp. 181–182.

standard business card.")

- **Operations Sheet.**—This is used for teaching a single basic operation or process. The instructions on an operation sheet are adaptable to any job or problem where that operation appears. (Example: "How to Operate the Microwave Oven.")
- **Information Sheet.**—This type of sheet supplies the student with information that is not readily available from other sources. It may contain information about new techniques or styles, career information, or the technical data needed to do an assigned job. (Example: "Unleaded gasoline: Its advantages and disadvantages.")

There are a number of other types of instruction sheets[5] that may be helpful to vocational teachers. The **assignment sheet** may be a sheet of problems to be solved, questions to be answered, observations to be made, readings to be done, or duties to be performed. Similar to the assignment sheet, the **experiment sheet** may be useful in the laboratory to aid students in performing tests or trial problems to demonstrate scientific principles.

The **project planning sheet** is often used in industrial arts and exploratory courses. Similar to the job sheet, it allows for much more student participation in planning than does the job sheet. A student can complete such a sheet to outline a personal project to be completed in the laboratory. **Work sheets** are printed forms which are filled in by students in the process of gathering data or solving problems.

All instruction sheets, of whatever type, require careful thought and preparation. Poorly conceived or shoddily produced materials may be worse than none. To avoid giving students misinformation and to prevent confusion in the laboratory, all facts, data, and specifications should be thoroughly checked for accuracy. In order to set standards which you expect students to match, your materials must be correct in spelling, grammar, and technical terminology. The layout should be attractive, and the reproduction of good quality.

The following are some general guidelines for developing instruction sheets:[6]

- Use language that is straightforward and easily understood by the students for whom the sheet is intended. Define new terms, and do not use words or phrases that are unusual or ambiguous.
- Supplement the words with sketches, illustrations, and diagrams for greater clarity.
- Give specific directions that are clear and concise. Carefully think through the sequence of the directions.
- Limit each instruction sheet to one piece of paper if possible, but avoid crowding the page.
- Separate the various items, points, or paragraphs by spacing, and by numbers, letters, or dots.
- Develop a uniform format for all instruction sheets so students can easily find the desired information. Space the various divisions of the sheet, such as title, purpose, illustrations, and text, to produce an easily read and attractive document.
- Use underlining to emphasize or to distinguish between headings, subheadings, and content.
- Be consistent in terminology to avoid confusion.
- Include only relevant materials. Avoid filling the sheet with irrelevant or unnecessary information, no matter how fascinating it may seem.

These general guidelines apply to all instruction sheets. More detailed and specific information on preparing job sheets, operation sheets, and information sheets is contained in the learning experiences that follow.

These instruction sheets can be used to help individualize instruction in the vocational laboratory by using the following method. Present the first lesson in the course or the unit on a class basis; that is, give the demonstrations or presentations to the entire class in a large-group session. Once the material has been presented, assign practice work to each student and give each a job sheet. Provide time for discussion of the job sheets, and then distribute other appropriate instruction sheets as needed (e.g., operation sheets for manipulative work, assignment sheets for theory work, and related information sheets).

Then allow each student to work individually, while you circulate among class members giving individual help where needed. You can thus give individual assistance to a number of students without having others idle. Some students will complete the assigned work satisfactorily while others are still working. You can examine the work of the students finishing first and evaluate the results. After the faster students have successfully completed their assignments, they can go on to the next job or help the slower students.

Thus, you can shift from class, to group, to individual instruction, in any sequence as is needed

5. Further information on instruction sheets is available in Module C–6, *Direct Student Study.*
6. Adapted from Cenci and Weaver, *Teaching Occupational Skills*, p. 186.

and as conditions dictate. In making full use of instruction sheets, you do not abandon class teaching, but at appropriate times give demonstrations, illustrated talks, and tests to the entire class. Students can progress as individuals or as small groups within the class. Better use can also be made of tools and equipment, since more of the equipment can be used more of the time. Yet, with good planning, it is unlikely that anyone need be idle because the equipment they need is in use.[7]

7. Adapted from Leighbody and Kidd, *Methods of Teaching Shop and Technical Subjects*, pp. 162, 163.

The following items check your comprehension of the material in the information sheet, Directing Student Laboratory Experience, pp. 6–11. Each of the five items requires a short essay-type response. Please explain fully, but briefly.

SELF-CHECK

1. In what general ways can the use of instruction sheets help the teacher to manage and organize the laboratory work?

2. What is the essential difference between a "Job Sheet" and an "Operation Sheet"?

3. Why might a vocational teacher want to furnish an "Information Sheet" to students even when textbooks and other materials are available to them?

4. Explain why a teacher may wish to give very detailed instructions for laboratory work on some occasions, and allow for a great deal of individual student planning at other times.

5. How can the availability of an instruction sheet help a student in doing his/her laboratory work?

Compare your written responses on the Self-Check with the Model Answers given below. Your responses need not exactly duplicate the model responses; however, you should have covered the same **major** points.

MODEL ANSWERS

1. Properly utilized, instruction sheets can free the teacher from constant repetition of instructions, provide time for working with individual students, make it easier to keep all students productively busy, and help maintain high standards of work. Regularly revised, instruction sheets allow the teacher to maintain a course of study that is up to date in content and consistent with approved teaching methods.
2. A "Job Sheet" gives the student instructions for a complete piece of work, whether a finished product or a complete service. An "Operation Sheet," on the other hand, is much more limited in scope, furnishing step-by-step procedures for a single operation or very specific manipulative skill. In order to complete the work described in the job sheet, the student might need to refer to several operation sheets.
3. By preparing information sheets, the teacher can furnish students with information about the latest techniques, trends, or materials in the occupation—things that are too new to be found in texts. These sheets can also be used to provide students with local regulations or trade practices, special interest information, hard-to-find data, career information, or especially good explanations of concepts.
4. Students with limited knowledge and experience will require detailed directions for laboratory or shop work, especially at the beginning of the course, if they are to be successful. More advanced students can be given more responsibility for planning their own work under the teacher's supervision, gradually being given only the kinds of general directions they would actually get on the job. Whenever you introduce completely unfamiliar or very difficult new skills, you may want all students to follow very explicit directions so they can perform correctly.
5. Students who have instruction sheets to help them in their laboratory work will have an accurate reference that they can consult when needed. They will not have to wait for the teacher's attention in order to get routine answers about operations, and they will save themselves time-wasting errors. Students can use the operation sheets to prepare for new jobs in which the operation occurs, or review for upcoming performance tests. Instruction sheets kept in an orderly file in a notebook become valuable references when students get on the job in the field.

LEVEL OF PERFORMANCE: Your completed Self-Check should have covered the same **major** points as the model responses. If you missed some points or have questions about any additional points you made, review the material in the information sheet, Directing Student Laboratory Experience, pp. 6–11. or check with your resource person if necessary.

NOTES

Learning Experience II

OVERVIEW

After completing the required reading, develop a job sheet to guide student progress in the laboratory.

You will be reading the information sheet, Developing Job Sheets, pp. 18–20.

You will be selecting a job in your occupational specialty and developing a complete and detailed job sheet for the selected job.

You will be evaluating your competency in developing a job sheet, using the Job Sheet Checklist, p. 23.

Activity

For specific information about the characteristics and use of the job sheet, and how to develop job sheets for laboratory use, read the following information sheet:

DEVELOPING JOB SHEETS

The teacher-prepared job sheet provides the student with instructions for doing a complete piece of work, or job, in the laboratory. The job may be a limited one involving only a few operations, or an extensive project requiring many hours of work. Jobs are designed by the teacher to include skills needed by the student to successfully enter his or her chosen occupational specialty. The following list illustrates some jobs that might be assigned by teachers to help students develop occupational skills.

Occupation	Job
Auto Mechanics	do a complete engine tune-up
Cosmetology	give a complete manicure
Agriculture	propagate a fruit tree
Carpentry	build a hip roof
Dressmaking	make a skirt
Drafting	make a working drawing
Office Machines	use the mimeograph process
Printing	produce a business letterhead
Upholstering	reupholster a side chair

If the job sheet is written for students with **limited experience,** it may be very structured and specific in its instruction. Beginning students may not at first know how to adequately organize and plan their work. They must be directed in preparing their work plans. They must be told the specific things they have to learn and the standards by which their progress will be evaluated.[8]

The job sheet prepared for these students should describe the final result in detail (either in words or drawings) and state the exact procedures to be used in sequence. The exact tools, materials, and equipment needed must be listed so nothing is left to chance or to student choice. On some complex jobs, such a sheet may contain scores of procedural steps for the student to follow.

A job sheet for **more advanced** students may be less fully detailed, with some information deliberately omitted to allow the student to individually solve some of the problems involved in the job. Some laboratory experiences may best promote learning by having the student plan the entire job from start to finish.

The content and comprehensiveness of the job sheet, therefore, must be based on the level of skills and experience expected of the class members, and will vary with the school, the program, and the course level. Sample 1 is an example of a

8. Adapted from Cenci and Weaver, *Teaching Occupational Skills*, p. 187.

simple job sheet that might be used in a metalworking shop.

Remember, however, that even though it is designed to be partly self-instructional, the job sheet is not intended, by itself, to **teach** the student how to perform the required operations. It is assumed that the student will receive adequate instruction from the teacher's demonstration and that the job sheet will provide a review of the lesson and serve as a guide for practice.[9]

9. Adapted from Cenci and Weaver, *Teaching Occupational Skills*, p. 187.

SAMPLE 1

JOB SHEET

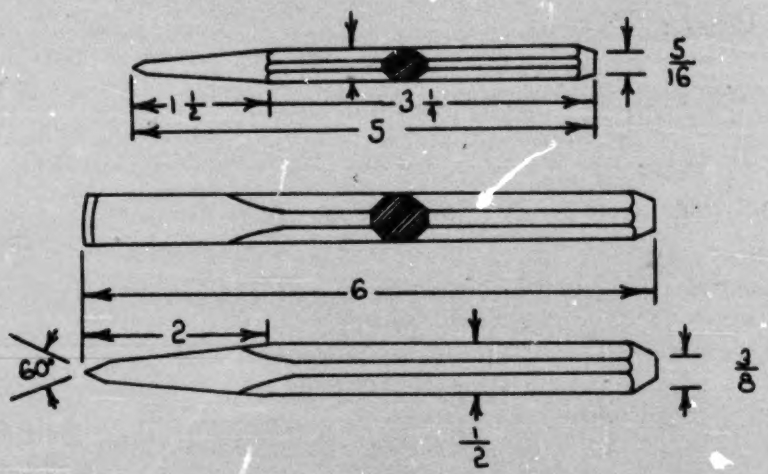
JOB TITLE: Make a Cold Chisel

UNIT: Shaping Metals
Forging

READING: Ludwig; pp. 349–356

OBJECTIVES: The student will demonstrate a knowledge of the concept of forging as a method of changing the shape and characteristics of metal. The student will exhibit basic skill in the use of the bench grinder and hand files.

LABORATORY WORK: Fabricate the cold chisel as per the drawings given.
Use high-carbon octagon steel stock. Heat in the bench furnace.
After forging to approximate shape, finish shaping by grinding on the rough pedestal grinder, then the bench grinder.
File to exact shape (Ludwig, pp. 413–414).
Check accuracy of point angle with center gauge.



EVALUATION: Teacher examination and inspection
1. Correct size, shape, and cutting edge angle.
2. Ground surfaces free of defects and properly formed.

Preparing Job Sheets

The format you use for your job sheets may vary based on the nature of the job, the competence of your students, and/or your own teaching style. However, certain basic information should be included in any job sheet. Sample 2 shows one way of formatting the job sheet. The material in italics describes the content which would be included under each heading.

The following are guidelines for developing job sheets:[10]

- State the aim of the job as a specific thing to be accomplished; e.g., a product to be produced, or a service to be rendered.
- Provide a brief statement covering the purpose of the job and an explanation of its nature.
- List the tools, materials, and equipment needed to complete the job.
- List, in the proper sequence, the steps involved in doing the job.
- Include illustrations to aid students in doing the job.
- Note any anticipated difficulties.
- Indicate precautions to be observed, safety procedures to be used, and directions for checking the accuracy of the job.
- Suggest references and resources which can be used to obtain further information about the job.
- List the operation sheets which cover the manipulative skills needed to perform the job.
- Pose any questions that are necessary for checking the completed job and the students' understanding.
- Include an estimate of the time required to complete the job.

Not all of the above items may be appropriate for every job sheet. As noted previously, the amount of detail included on a job sheet may be gradually reduced as the student progresses in the course. Ultimately, as students become more skilled, the job sheet may include only a drawing, sketch, or brief written directions similar to those provided on the job.

10. Adapted from Cenci and Weaver, *Teaching Occupational Skills*, p. 187.

SAMPLE 2

JOB SHEET FORMAT

JOB TITLE:	*[Name the job in a word or two.]*
UNIT:	*[Unit of instruction for which the job is designed.]*
READING:	*[Reading assignment or reference required for the knowledge phase of this job.]*
OBJECTIVES:	*[Teacher's statement of objective(s) for this specific job, stated in terms of student performance.]*
LABORATORY WORK:	*[Teacher's instructions for completing the skills phase of the job. Including, as appropriate:* *Materials required* *Tools and equipment required* *Illustration or drawings of complete job* *Step-by-step procedures* *Dimensions and/or specifications* *Safety precautions or special requirements]*
EVALUATION:	*[Teacher's description of evaluation methods and criteria of evaluation.]*

Using your own occupational specialty as a frame of reference, select a job that could be appropriately presented in a job sheet. Assume that you are teaching a class of beginning students with average ability. Develop a complete and detailed job sheet for those students to use to complete laboratory work in the instructional area you selected. You may use the job sheet format shown in Sample 2, another format better suited to your occupational specialty, or one suggested by your resource person.

After you have developed your job sheet, use the Job Sheet Checklist, p. 23, to evaluate your work.

NOTES

JOB SHEET CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
1. The job sheet was developed on the basis of the degree of experience or skill possessed by the students	☐	☐	☐	☐
2. The directions were clear and explicit	☐	☐	☐	☐
3. The directions were supplemented with sketches, illustrations, or diagrams as appropriate to ensure clarity	☐	☐	☐	☐
4. The procedural steps involved in performing the job were listed in the proper order and were complete	☐	☐	☐	☐
5. The tools, materials, and equipment needed were listed	☐	☐	☐	☐
6. Required and optional readings were included where appropriate	☐	☐	☐	☐
7. The correct occupational and technical terminology was used	☐	☐	☐	☐
8. The critical points in the job were noted	☐	☐	☐	☐
9. Safety precautions to be observed were indicated	☐	☐	☐	☐
10. Evaluation methods and criteria of evaluation were specified	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, review the material in the information sheet, Developing Job Sheets, pp. 18–20, revise your job sheet accordingly, or check with your resource person if necessary.

NOTES

Learning Experience III

OVERVIEW

After completing the required reading, develop an operation sheet to guide student progress in completing a job.

You will be reading the information sheet, Developing Operation Sheets, pp. 26–29.

You will be selecting an operation in your occupational specialty and developing a complete and detailed operation sheet for the selected operation.

You will be evaluating your competency in developing an operation sheet, using the Operation Sheet Checklist, p. 31.

For information about the specific characteristics of the operation sheet, and how to develop operation sheets for laboratory use, read the following information sheet:

DEVELOPING OPERATION SHEETS

An "operation" is **one step** in the process of doing a complete job. Driving to the grocery store for a quart of milk is a job, but getting the engine of the car started is one operation in that job. Each defined operation in a trade requires some special knowledge or skill and is usually the topic of a lesson or demonstration presented by the teacher.

When the lesson is written out, duplicated, and given to students, it becomes an "operation sheet." For example, in the owner's manual of every new automobile there is an operation sheet on "How to Start the Engine." Operation sheets are applicable to all types of teaching in which the subject matter can be analyzed into units of performance.

The following list of examples indicates one of the operations that would be involved in the given job:

Occupation	Job	Operation
Auto Mechanics	Engine tune-up	Remove and replace spark plugs
Cosmetology	Manicure	Apply nail polish
Agriculture	Propagate trees	Make a veneer graft
Carpentry	Build a hip roof	Lay out common rafters
Dressmaking	Make a skirt	Put in a zipper
Drafting	Make a working drawing	Use a compass
Office Machines	Produce stencil materials	Make a stencil
Printing	Produce a letterhead	Ink the press
Upholstering	Reupholster a chair	Attach the webbing

Modern textbooks in the occupational service areas are usually filled with clearly written and well-illustrated instructions for common operations. The teacher will find it worthwhile to develop or duplicate operation sheets for the class if—

- the operation is new or unusual, or for some other reason textbook instruction is not available
- students need to refer to instructions frequently in order to complete the laboratory work
- it is desirable for students to have the operation sheet in their notebooks for future reference on the job

The operation sheet should be distributed to each student individually when he or she is ready for it. Such sheets may be provided to students after a teacher demonstration in a conventional program—or may be included in learning packages or modules in an individualized vocational program. Sample 3 is an example of a simple operation sheet that might be used in a vocational agriculture lab.

SAMPLE 3

OPERATION SHEET

OPERATION TITLE: Making a veneer graft on tree stock.

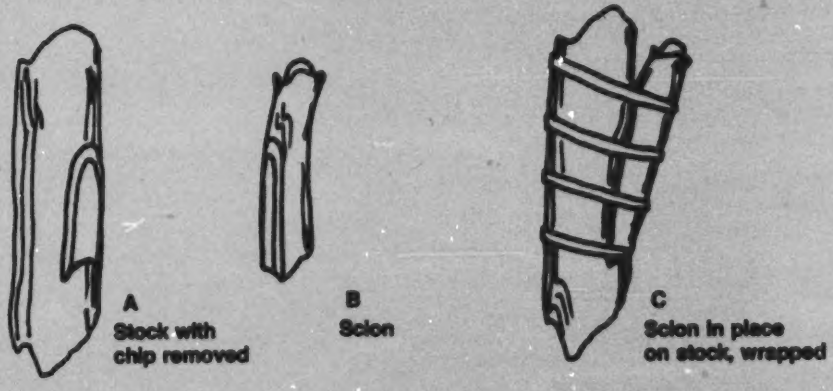
PURPOSE: The veneer graft can be used successfully to propegate fruit trees on stock one year old or older.

CONDITIONS OR SITUATIONS FOR THE OPERATION: Scions should be terminal, 3 to 4 inches long, ⅜ to ½ inch in diameter. Buds should be swollen, but not sprung. A large terminal bud on scion is preferred.

EQUIPMENT, TOOLS, AND MATERIALS: .0035" vinyl film strips
sharp knife

PROCEDURE:

1. Make a slanting cut about 2" long in side of stock so that at the bottom the cut is 1/16" to 1/8" in depth.
2. Make an angular cut at the base of the large cut so as to remove the piece of bark and wood. (Fig. A).
3. From the scion, cut a piece of bark and wood to correspond with the cut in the stock. (Fig. B)
4. Fit the little tongue on the base of the scion into the notch at the lower end of the cut on the stock.
5. Wrap the graft snugly with a strip of vinyl film, leaving the terminal bud exposed. (Fig. C) The graft should take in 3 or 4 weeks.



A
Stock with chip removed

B
Scion

C
Scion in place on stock, wrapped

PRECAUTIONS: Exercise extreme caution when cutting the scion with the razor-sharp knife.

QUALITY CRITERIA:

1. A large terminal bud was selected for grafting.
2. Cut in stock is at least 1½" long and 1/16" in depth at the bottom.
3. Cut on scion fits neatly into cut on stock.
4. Graft is securely wrapped with bud exposed.

Preparing Operation Sheets

The operation sheet[11] should be confined to instruction on one operation or one step of a job. It should explain how to do a very specific and limited thing. Sample 4 shows one way of formatting an operation sheet. The material in italics describes the content which would be included under each heading.

The following suggestions will prove valuable when writing operation sheets for training purposes:

- Describe or name the operation clearly. Be certain yourself that you are describing a specific operation and not a complete job.
- Use the correct and accepted occupational and technical terminology.
- List, in the proper order, all the steps involved in performing the operation.
- State the instructions in clear and concise language. This is no place to get wordy.
- Use illustrations, diagrams, or drawings to clarify the steps of the operation and to save words.
- Indicate any special safety precautions to be observed.
- Indicate any critical points which are essential to the success of the operation.
- State the accepted criteria for the quality of the operation (appearance, finish, texture, dimensions, etc.) so the student can be sure that the operation has been performed successfully.
- List jobs in which the operation may appear.

Good examples of materials which are similar to operation sheets may be found in the instructions that accompany almost any household gadget or small appliance. Vocational and industrial arts

textbooks usually contain a great amount of material on how to carry out specific operations. The popular home-mechanics and homemakers' magazines are expert at describing operations in an attractive form easily understood by the general reader. It would be profitable for beginning teachers to consult such types of material for ideas as they develop their own operation sheets.

11. Material on operation sheets is adapted from Cenci and Weaver, *Teaching Occupational Skills*, pp. 188–189.

SAMPLE 4

OPERATION SHEET FORMAT

OPERATION TITLE:	*[Describe the operation in a few words.]*
PURPOSE:	*[Describe the purpose or use of the operation in a sentence or two.]*
CONDITIONS OR SITUATIONS FOR THE OPERATION:	*[Describe or list situations in which the operation is to be performed, or the conditions necessary for the operation to take place.]*
EQUIPMENT, TOOLS, AND MATERIALS:	*[List the equipment, tools, and/or materials required for the operation.]*
PROCEDURE:	*[Give step-by-step procedures for completing the operation. Include, if appropriate, illustrations, drawings, or diagrams to clarify the procedures involved in the operation.]*
PRECAUTIONS:	*[Describe or list any special safety or quality control precautions to be noted in the operation.]*
QUALITY CRITERIA:	*[Describe the acceptable final appearance, fit, or performance, so the student can evaluate his or her success in performing the operation.]*

Select an operation in your occupational specialty that could appropriately be presented in an operation sheet. If you completed Learning Experience II, the operation may be one involved in the job for which you prepared a job sheet, or it may be some other operation. Be sure that you are selecting a specific operation and not a complete job.

Assume that you are teaching a class of beginning students with average ability. Develop a complete and detailed operation sheet for those students to use to guide them in the operation. You may use the operation sheet format shown in Sample 4, another format especially suited to your occupational specialty, or one suggested by your resource person.

After you have developed your operation sheet, use the Operation Sheet Checklist, p. 31, to evaluate your work.

OPERATION SHEET CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
1. The operation sheet was confined to one operation or one step of a job	☐	☐	☐	☐
2. The operation sheet was developed on the basis of the degree of experience or skills possessed by the students	☐	☐	☐	☐
3. The directions were clear and explicit	☐	☐	☐	☐
4. The directions were supplemented with clear sketches, illustrations, or diagrams	☐	☐	☐	☐
5. All key steps involved in performing the operation were listed in the proper order	☐	☐	☐	☐
6. The correct occupational and technical terminology was used	☐	☐	☐	☐
7. Critical points in the operation were noted	☐	☐	☐	☐
8. The purpose of the operation and/or the situations in which it is to be performed were described	☐	☐	☐	☐
9. Safety precautions to be observed during the operation were indicated	☐	☐	☐	☐
10. Criteria for judging acceptability or quality of the final results of the operation were given	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, review the material in the information sheet, Developing Operation Sheets, pp. 26–29, revise your operation sheet accordingly, or check with your resource person if necessary.

NOTES

Learning Experience IV

OVERVIEW

After completing the required reading, develop an information sheet to provide students with information relating to planned laboratory experience.

You will be reading the information sheet, Developing Information Sheets, pp. 34–36.

You will be selecting a topic in your occupational specialty that must be presented to students for them to complete a job in the laboratory, and developing an information sheet for the selected topic.

You will be evaluating your competency in developing information sheets, using the Information Sheet Checklist, p. 37.

Activity

For information on the uses of information sheets in the vocational laboratory, and how to develop these sheets, read the following, which in itself is an information sheet:

DEVELOPING INFORMATION SHEETS

As the name implies, information sheets are developed by the teacher simply to provide special information for students. The information may be special because it is very new, very obscure, difficult to obtain, or necessary to have close at hand. It may be technical information, enrichment information, career information, or any information related to the subject matter of the vocational service area. Most good information sheets meet the following criteria:

- The information sheet is designed to directly further student accomplishment of the performance objectives of the program.
- The information presented in the sheet is especially developed for the student group and is not readily available in any other form suitable for their use.
- The information sheet is directly related to the activities in the classroom and/or laboratory, and is not designed to be simply filed away.

Modern technology moves very rapidly, while standard classroom textbooks take years to go through the publication process. Therefore, texts often quickly become out of date. Because of this, a current information sheet makes a valuable supplement to the textbook and helps to keep the program abreast of technical progress. You can summarize an article from a recent technical journal and produce it as an information sheet, illustrate a new fashion trend, or report material gathered while you were attending a trade conference.

When new information relevant to the work of the class appears, you can get this information quickly to students using an information sheet. For example, if you hear a radio program describing the development of a more easily digestible form of milk, you could summarize the broadcast in an information sheet for your class of vocational agriculture students.

Presenting hard-to-find technical data is another valuable use for information sheets. Facts, formulas, statistics, tables, and specifications are often needed by students in order to solve laboratory problems, but these data may not be available from the usual school resources. Such material can be abstracted from catalogs, handbooks, government publications, and industrial sources

and prepared for student use. Some manufacturers provide data sheets that are not only useful, but already in a form suitable for student laboratory notebooks.

Much available information needs only to be reorganized and presented in a manner students will be able to accept and understand. Important information in which the reading level is too high for the students can be rewritten, and material that appears dull in its original form can be made attractive by the creative teacher. Hard to comprehend information may be made clearer by illustrations and drawings. Sample 5 is an example of an illustrated information sheet which might be used in a health services course.

You should be strongly reminded to resist the temptation of duplicating materials straight from published materials just because they are handy and roughly related to the subject matter of the class. Copying an article, for instance, directly from a popular magazine and calling it an information sheet is poor practice. Most obviously, it puts the teacher in technical violation of copyright laws—not a good example for students to follow.

SAMPLE 5

INFORMATION SHEET

ARE YOU IMMUNE TO THESE MYTHS?

The general public is becoming indifferent to the need to get vaccinated against serious diseases. At one time people stood in line for hours to get vaccinated against polio. Now, since they may not see children who have been crippled by polio, people are becoming careless about the need for immunization. As you deal with the public in working in the health services, you should be prepared to give correct information when you hear people who believe in the following myths:

MYTH NO. 1

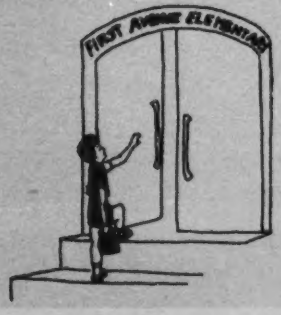
"Childhood diseases have been wiped out in this country."

This is simply not so. There are still epidemics that cripple or kill children. The immunization rate for some diseases is so low that an epidemic could break out at any time.

MYTH NO. 2

"Immunization isn't really necessary until children reach school age."

On the contrary, epidemics take their heaviest toll in the preschool age group. Infants are the most frequent fatalities from diphtheria and whooping cough.



MYTH NO. 3

"Vaccination is only for kids."

In fact, adults **without** vaccination are frequent victims of tetanus, diphtheria, mumps, and rubella. These are serious diseases for adults.

MYTH NO. 4

"If you were vaccinated once, you're protected for life."

Diphtheria and tetanus vaccinations require a booster shot every ten years. Many diseases, including influenza, smallpox, and typhoid, require re-vaccination.

In addition, the article may well be too lengthy to make an effective information sheet, or may contain material irrelevant to your lesson. Because it is written for the general public, it may not be well suited to students in a vocational class. You would do better to read the article thoroughly, and then condense its main ideas into a single sheet written in a style appropriate for the students, with an acknowledgement of the source.

Preparing Information Sheets

Because information sheets may take such a wide variety of forms, there are few specific guidelines for their development. The varying purposes of information sheets make it impractical to use any **single** format or design. The most important factors in information sheet design follow:

- Make the information sheet attractive in appearance and easy to read. This sheet is usually not as essential for students to have in order to complete the assigned work as is, for instance, the job sheet. Therefore, everything possible must be done to encourage them to read it. Typing must be of high quality, reproduction good, illustrations clear and interesting.
- Construct the sheet so it is usable and easy to file for future reference. It will help to print the sheet on durable paper, and to have it punched for filing in students' notebooks.
- Acknowledge the sources of information; some students may be encouraged to read further. If much of the material is taken almost directly from a publication, note this on the sheet. It is unethical to plagiarize (that is, to pass off others' ideas and work as one's own). It is generally an infringement of the copyright laws to duplicate a page from a book and distribute copies to the class without the publisher's permission.
- Suggest additional sources of further information for students who may have a particular interest in the subject of the information sheet. Encourage the use of the library at every opportunity.

Select an instructional area in your occupational specialty suitable for developing an information sheet. If you completed Learning Experience II, the content of the information sheet to be developed may relate to the job you selected to use in that experience.

Assume that you are teaching a class of students with average reading ability. Develop an information sheet for the instructional area you selected. You may use any suitable format, keeping in mind the design factors listed above in the information sheet, Developing Information Sheets.

After you have developed your information sheet, use the Information Sheet Checklist, p. 37, to evaluate your work.

INFORMATION SHEET CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
1. The information sheet in its present form is essentially the work of the teacher	☐	☐	☐	☐
2. Direct sources of information from which the sheet has been drawn are acknowledged	☐	☐	☐	☐
3. The layout, typing, drawings, and reproduction are attractive in appearance and legible	☐	☐	☐	☐
4. The content is directly related to the objectives of the selected instructional area	☐	☐	☐	☐
5. The information or technical data is current and accurate	☐	☐	☐	☐
6. The content and presentation approach are appropriate to the interests and reading level of the students	☐	☐	☐	☐
7. The information is not otherwise readily available in a form suitable for the students	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, review the material in the information sheet, Developing Information Sheets, pp. 34–36, revise your information sheet accordingly, or check with your resource person if necessary.

NOTES

Learning Experience V

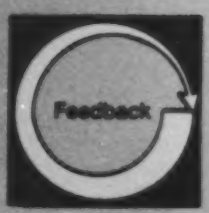
OVERVIEW

After completing the required reading, critique the performance of the teacher in a given case study in directing students in developing work plans.

You will be reading the information sheet, Directing Students in Developing Work Plans, pp. 40–42.

You may wish to read the supplementary reference, Giachino and Gallington, *Course Construction in Industrial Arts, Vocational and Technical Education*, pp. 290–297.

You will be reading the Case Study, p. 43, and writing a critique of the performance of the teacher described.



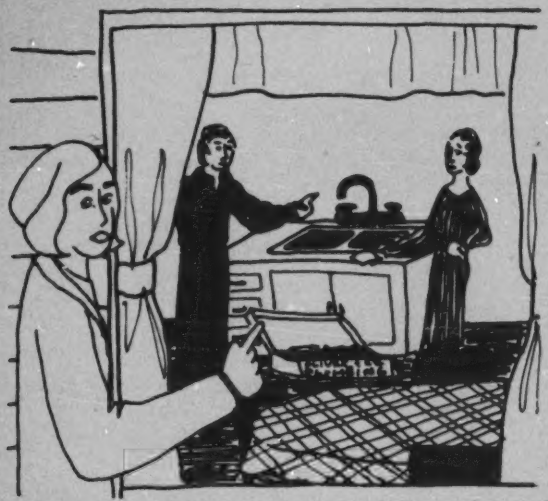
You will be evaluating your competency in critiquing the teacher's performance in directing students in developing work plans by comparing your completed critique with the Model Critique, pp. 45–46.

Activity

Read the following information sheet to learn how to aid students as they begin to plan their own laboratory activities.

DIRECTING STUDENTS IN DEVELOPING WORK PLANS

Vocational students need to have the opportunity to learn how to plan their own work so that they may be able to work efficiently away from the controlled conditions of the school laboratory. All good artisans think through what they are going to do before they start the job. Experienced craftsmen and technicians plan carefully, though their plans may be very informal, consisting of few words and some rough sketches. Some skilled workers "talk through" their plans with a fellow worker or even with a customer.



The value of having students follow planned laboratory procedures is generally recognized. Teachers have long provided for this by developing carefully constructed job sheets and operation sheets. The teacher should give instruction, however, in such a way that students will eventually be able to select their own jobs and plan their own work to satisfy their educational needs. This is an important step toward being able to plan work and solve problems when they become full-time workers. The methods you use to reach the goal of independent student work-planning will be affected by the instructional level at which you teach, the abilities of your students, and your occupational service area.

As students without previous experience begin a vocational program, they should probably progress through several phases or levels of job planning. The earliest experiences may consist of completely teacher-directed planning. As students gain some experience and skill, they should be able to participate in cooperative teacher-student planning. The most advanced student should be able to independently plan a job assigned or suggested by the teacher. Ultimately, these advanced students should be capable of independently planning an original project or a unique solution to an occupational problem.

There is no sharp dividing line between these levels, and students should gradually move to more and more independent planning as they are ready. Some types of work and some subject matter areas lend themselves to student planning better than others. The teacher, as an occupational specialist, must be aware of the opportunities for student planning as well as the limitations.

At the level of cooperative teacher-student planning, you should select the job and then have students plan as a group under your guidance. Using group discussion techniques, the class may decide on the materials to be used for the job, determine some of the design details, establish which tools and processes are appropriate, and work out the sequence of procedures to be used. Individually, the students may make their own drawings and write out plans for their own use.

Independent student planning of a teacher-suggested job can be widely applied in vocational education. The job may be chosen because it involves skills and processes that must be learned by the student, but each student can be allowed to plan his or her own means of doing the job and acquiring the necessary skills.

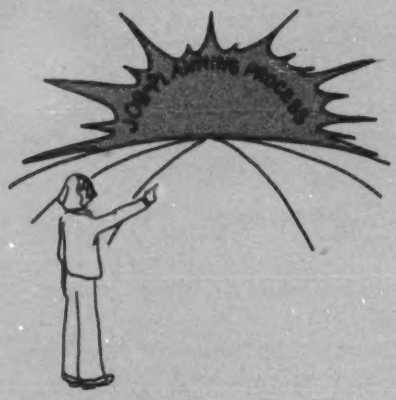
Students can be motivated to undertake the given task through the use of models, illustrations, pictures, previously finished jobs, or drawings. Then, the student can develop his or her own original plans, complete with drawings, dimensions, finished specifications, statements of procedures, or whatever other written materials are appropriate.

During the early stages of the student's planning, you can guide, encourage, and help make some basic decisions. During the later stages, you can question the student about details, ask the student to defend his/her choices, and make suggestions for rethinking the procedures. Finally, you and the student can cooperatively check over the plans in detail, attempting to eliminate errors and omissions.

When you are ready to work with the class to plan for a selected job, you must first plan how the necessary lessons are going to be conducted. All the principles of good lesson planning should be utilized in order to make the planning session a productive one. The lesson introduction should describe the selected job and relate its importance to the students' learning. The planning task of the group should be outlined, and any anticipated difficulties discussed. The chosen planning method and format may be presented, with opportunity given for the group to respond and ask questions.

If the group is sufficiently advanced, each student can then work independently or in small groups to develop the procedures and any necessary drawings. You can function as a resource person, helping to resolve difficulties or suggesting sources of information. A beginning group, on the other hand, may need you to continue leading a discussion on planning, with students suggesting the procedures and offering corrections to each other.[12]

There are several things you can do to enhance the job-planning process.



- Provide an environment designed to stimulate creative ideas by displaying pictures, drawings, finished jobs, models, etc.
- Provide a wide variety of resource materials including books, periodicals, references, catalogs, specification sheets, and similar materials.
- Provide a suitable environment for planning, with clean, quiet, well-lighted, and comfortable facilities.
- Provide a classroom atmosphere conducive to good planning; i.e., informal, open to ideas, and stimulating. Helping students to plan is more of a guidance function than it is a job of supervision or direction.
- Provide the tools and materials for planning, including the necessary drawing instruments, paper, or special forms.
- Provide a job planning sheet that is simple for the student to use, yet one that provides a framework within which the student can construct complete plans.

Sample 6 is an example of a format for a simple job planning sheet, usable in many vocational education areas. This format may be used by the student in preparing original plans for a job. The material in italics describes the content which would be included under each heading. Many vocational areas, however, have developed planning sheets particularly suitable for their special laboratory activities. Therefore, before deciding to use any one format, you should first check around to see what is available, or what is recommended.

12. To gain additional skill in guiding student planning, you may wish to refer to Module C–9, *Employ the Project Method.*

SAMPLE 6

JOB PLANNING SHEET

Student's Name _____

NAME OF JOB: _____

SKETCH OR DRAWING: *[Student-made drawing as appropriate for the job.]*

MATERIALS REQUIRED: *[Student figures materials for job, and inserts materials list here.]*

MATERIALS COSTS: *[Estimated cost of the completed job, if appropriate.]*

PROCEDURE: *[Student lists planned procedures, in sequence.]*

_____

Instructor's approval

[Signed before student begins job]

For further information on assisting and directing students in planning, you may read Giachino and Gallington, *Course Construction in Industrial Arts, Vocational and Technical Education*, pp. 290–297. Note that in this reading the authors are discussing ways in which the teacher can help students to learn to plan their work as they become more capable and experienced in their field.

Read the following Case Study describing how Mr. Lefkowitz, a vocational teacher, directed students in developing work plans. As you read, consider (1) the strengths of the teacher's approach, (2) the weaknesses of the teacher's approach, and (3) how the teacher should have directed the students. After completing your reading, **critique in writing** Mr. Lefkowitz's performance in directing students in developing work plans.

CASE STUDY

Mr. Lefkowitz, a new business and office instructor, had been asked to teach a course in office machines. He wanted to teach the class not only how to operate each piece of office machinery they might encounter on the job, but also how to maintain and make simple adjustments on the equipment. In some cases, there were safety hazards associated with a particular machine. Students would need to be made aware of safety precautions they should take.

The laboratory he was given to work in was brand new and quite elaborate. There was carpeting on the floor, desirable lighting, adequate ventilation, and many windows. There was a wide variety of new equipment typical of that used on the job. The equipment was laid out so there was plenty of space for free traffic flow and for small groups to easily observe a teacher-demonstration of any given piece of equipment. Given such a desirable facility in which to teach, Mr. Lefkowitz was determined to produce a superior course.

During the first part of the course, he carefully explained to the students the function of each machine and what they would need to know about each. Then, he demonstrated its use to the students. Next, he provided them with information sheets and operation sheets he had prepared for each machine and with supplementary resource materials, both printed and audiovisual.

Each student then got a chance to operate the machine under his supervision while the others observed, pursued the information in the resource materials, or practiced further on a machine previously covered. Finally, as a student showed readiness, Mr. Lefkowitz would give him or her an assignment sheet requiring the operation of the machine. Everything went beautifully.

During the second part of the course, Mr. Lefkowitz wanted each student to put some of these skills together by planning and completing a total job on his/her own. Since these jobs would probably vary greatly, he decided not to provide them with a planning sheet which might, he thought, limit their creativity.

He explained to the class that they were to select a job typical of one they might later perform when employed. This job was to involve several operations and, preferably, the use of a number of machines. He described to them some of the jobs he had completed both in school and on the job. He told them they were to work independently for three days in order to come up with detailed plans and specifications concerning the job they selected.

For the next three days, the students quietly and diligently sat at their desks, obviously busily at work. Mr. Lefkowitz also sat at his desk, preparing a checklist for evaluating the plans once they were completed. At the end of the three days, he explained how the plans would be evaluated and read to them the items on the checklist. Then, he asked them to turn in their plans before leaving the class.

Mr. Lefkowitz was astonished and dismayed as he reviewed the plans to discover that all had not gone as planned. Four of the plans were nearly blank pieces of paper. Two students had turned in no plans at all. Three students had, in fact, turned in model plans, but two others had turned in detailed plans for "jobs" that weren't jobs at all. The rest of the plans varied, but most were sadly incomplete. Mr. Lefkowitz had to conclude that these students were just not ready to do anything on their own and quite possibly might never progress beyond bare entry-level skills on the job.

NOTES

Compare your completed written critique of the Case Study with the Model Critique given below. Your response need not exactly duplicate the model response; however, you should have covered the same **major** points.

MODEL CRITIQUE

The best laid plans of mice and Mr. Lefkowitz oft go astray. Mr. Lefkowitz certainly was off to an excellent start in the first part of the course. He took one machine at a time, explained it, demonstrated its use, allowed practice, and required skill to be demonstrated according to an assignment sheet.

Using a multitude of resources and instruction sheets, he individualized instruction and created a smoothly running laboratory situation. In addition, these activities should have prepared them to begin to develop their own work plans. Since everything went beautifully, Mr. Lefkowitz was justified in assuming they were ready to do so.

The failure of the majority of the students to produce acceptable work plans was caused by a number of weaknesses in Mr. Lefkowitz's plans for the second part of the course. First, he moved too quickly from simple operations directed entirely by the teacher to overall work plans developed on a completely independent basis.

He should have started by giving them teacher-prepared work plans. Then, he might have asked them to develop work plans cooperatively with him. Finally, he could have had them develop independent plans. This sequence would have prepared students better for the task he was requiring of them.

Secondly, he should have at some time provided them with a structured planning sheet. Such a sheet lets students know what items their plans should cover and helps the student who is new to planning get started. At the point at which students were ready to plan independently, they could develop a planning format of their own using the model as a basis.

The checklist could have also been used to provide structure. Preparing such a checklist for evaluating the plans was an excellent idea (although it should not have been developed during class time). Had it been developed in advance, copies could have been provided to students to guide them in their planning.

Providing students with verbal examples of jobs from his own experience might have been a good idea if those jobs represented jobs currently required in the real world of work. However, other examples should have been provided also. He should have had visual displays showing completed plans and completed jobs that students could have examined.

Furthermore, although he used resources well in the first part of the course, he dropped their use completely during the second part. He could have provided students with a variety of resources which could have helped them in selecting an appropriate job, determining the operations involved, and developing adequate plans. Information sheets explaining how to develop work plans could have also been prepared and distributed. If necessary, drawing tools and other materials needed for developing the plans should have been made available.

Rather than requiring a totally individualized effort, Mr. Lefkowitz could have provided some time for group discussion, brainstorming, or interaction between small groups of students. These activities could have eliminated problems, increased progress, and promoted creativity.

He should not have been caught unawares with inadequate plans when the assignment was handed in. During the planning stages, he should have been away from his desk, circulating amongst the students and monitoring their progress. Even with "independent" planning, the teacher should be assisting the student who is stuck, catching problems before they multiply, and giving verbal pats on the back to students who are progressing well.

In the case of Mr. Lefkowitz's class, more than that was needed. They were new to the task of developing work plans. Therefore, he should have helped them to select an appropriate job and to select the necessary materials and equipment. It is not surprising that some students selected inappropriate jobs. Based on the direction they had received, some students probably also selected

material and equipment which would cost so much that they would be unable to actually complete the job.

The fact that the completed plans varied so much in quality indicates that there are vast individual differences in the abilities of the students in Mr. Lefkowitz's class. He should have been aware of these differences and planned and acted accordingly. During the planning period, the students who were progressing efficiently should have been allowed more independence. The students encountering difficulties should have been given the direction and guidance they required either on an individual or small-group basis.

Finally, Mr. Lefkowitz did not have to arrive at his final conclusion. True, some students were not ready for the task, but that did not mean they would never be ready. It should have been his job to measure the readiness of each individual student and to provide the direction each needed to reach readiness. It is to be hoped that he will discover his error and allow students to revise their plans, this time with needed assistance from their instructor.

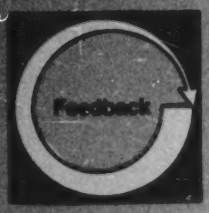
LEVEL OF PERFORMANCE: Your completed critique should have covered the same **major** points as the model response. If you missed some points or have questions about any additional points you made, review the material in the information sheet, Directing Students in Developing Work Plans, pp. 40–42, or check with your resource person if necessary.

Learning Experience VI

OVERVIEW

Given a case study of a teacher directing student laboratory experience, critique the performance of that teacher.

You will be reading the Case Study, p. 48, and writing a critique of the performance of the teacher described.



You will be evaluating your competency in critiquing the teacher's performance in directing student laboratory experience by comparing your completed critique with the Model Critique, p. 49.

You may wish to visit a laboratory session in an actual school vocational program to observe a teacher directing student laboratory experience.

The following Case Study describes one vocational teacher's hectic morning in the laboratory. Based on your reading and knowledge of how to direct student laboratory experience, critique in writing the way in which Mr. Clutch planned and prepared for his laboratory session. What problems will probably arise during the laboratory period? How could these problems be avoided? Be sure to also note any strengths in his preparation.

CASE STUDY: THE CASE OF THE SLIPPING CLUTCH

Mr. Clutch, in his first year as auto mechanics teacher at Edsel High School, needed to find his colleague, Mr. Eveready, in a hurry. Mr. Clutch's class was going to begin their practice work today on relining brakes, and Mr. Clutch wanted to borrow the job sheets and operation sheet that Mr. Eveready had brought along with him from his former job in the industry—just what he needed to introduce his beginning students to the real world!

He hoped Mr. Eveready would have enough copies to go around—he wanted to be sure that each of his 20 students had the same instruction sheets. Otherwise, he might not be able to give the class the written test at the end of the period.

While the students were taking the test, he intended to walk around the laboratory and check to see who had finished the job on time and who hadn't. Those sheets would also give him free time during the period so he could talk to Joe Headers, the student who was preparing to give the class a demonstration on replacing disc brake pads.

He hoped the students didn't have too many questions before they started their work. The lecture and demonstration he'd given during the last class period had certainly been thorough, and it seemed to have gone over pretty well. But, if he saw that too many students were uncertain about what to do, he just might have to postpone the practice work and give the lecture all over again.

It was too bad that a few students who were unable to catch on to the simplest operations were constantly holding up the whole class! Some of his students were so quick they almost didn't need him at all, but those others . . . they couldn't seem to organize themselves or plan their work without somebody telling them what to do every minute.

Well, those job sheets of Mr. Eveready's might do the trick. Besides, after his lecture, he had given the class a reading assignment from the textbook on brake assembly, so maybe a few of them had read it . . . but he doubted it.

Fortunately, he'd gotten all the work stations set up this morning, and the laboratory really looked shipshape. As usual, though, there weren't enough equipment and tools to go around. He thought he'd try dividing the class into small groups with a bright kid in each group to help the others along. That one student would probably do all the work, though, while the others just sat around and watched. How he was going to make sure that everybody got done on time was beyond him, but what else could he do?

Compare your completed written critique of the Case Study with the Model Critique given below. Although there is no one right answer (some people may see more problems arising than others; some might feel the need for more information about the students or the laboratory situation before they could evaluate some of Mr. Clutch's actions), you should have covered the same **major** points.

MODEL CRITIQUE

Asking beginning students to use job sheets originally made for industrial purposes is probably a mistake. Many of Mr. Clutch's students will no doubt have difficulty understanding the job and will require more explicit directions than are needed by experienced workers. Mr. Clutch should have prepared job sheets especially geared to the needs and abilities of his students.

Students who have difficulty in organizing themselves and planning their work need guidance in how to attack a job and how to proceed with the work. Instead of just complaining about them, Mr. Clutch should help them think through the job, and gradually give them more responsibility to plan their work.

In any case, the difficulties of a few students should not stop the progress of the whole class. As it is, Mr. Clutch's laboratory period may be disorganized and chaotic.

A reading assignment before doing the laboratory work should indeed help the class by (1) reminding them of the points covered in the demonstration they saw, and (2) filling in the things they may have missed. However, Mr. Clutch should allow class time to check on the students' reading, discuss the information, and question them about their understanding of the material.

It is most unwise to give the same lecture over again, even if some students failed to learn completely the first time. Students who did learn during the first lecture will be bored and resentful; students who didn't learn will probably be little better off the second time.

Mr. Clutch could well use different strategies with the slower learners—perhaps taking them aside as a small group and using another approach to the lesson, providing them with additional operation sheets, or giving them careful individual attention as they start practice work.

If Mr. Clutch works with one student during the laboratory period, he must also keep up with what is going on with the rest of the class. Mr. Clutch will have to disengage himself from his talk with Joe in order to circulate around the work stations, look over each student's work, ask questions, and give a bit of assistance where it is needed. If he ignores the class, motivation, interest, and discipline will all probably drop dramatically.

Organizing the students into work groups will indeed help get maximum use out of the available tools and equipment. If done intelligently, it will encourage students to help each other. Mr. Clutch will still have to check the work of individual students and evaluate each student's performance on this job. The work may proceed in group form, but Mr. Clutch will have to see that individual learning takes place as well.

Having all students begin a job together and all complete it at the same time might be very convenient for the teacher, but it just doesn't work out that way, nor is it necessary that it should. Mr. Clutch can take up the slack smoothly by preparing additional work for the fast students, giving the unit test to small groups as they are ready for it, or having early finishers go on to some new activity. If Mr. Clutch used a progress chart, both he and his students could see which skills they had developed and which needed more work and practice.

Unless he changes his plans, it looks as though Mr. Clutch is in for a rough day in the auto mechanics laboratory. Because he has not done well in planning the period with his students' needs in mind, he will be under constant pressure, and at the end of the day there will be one worn-out Clutch.

LEVEL OF PERFORMANCE: Your completed critique should have covered the same **major** points as the Model Critique. If you missed some points or have questions about any additional points you made, review the readings in the previous learning experiences, pp. 6–11, 18–20, 26–29, 34–36, and 40–42, or check with your resource person if necessary.

To become further acquainted with the responsibilities of vocational teachers in directing student laboratory experience, you may wish to arrange through your resource person to visit a laboratory session in an ongoing vocational program. Select a program in your own occupational area if possible. Make arrangements with the school and the teacher ahead of your visit. Observe both the teacher's activities and the students' responses. React to your observations on the basis of what you have learned about the teacher's role in preparing for and managing effective laboratory experiences. You may wish to discuss the results of your observation with your resource person.

Learning Experience VII

FINAL EXPERIENCE

In an **actual school situation,*** direct student laboratory experience.

As you plan your lessons, decide when student laboratory experience could be used effectively to aid in meeting the lesson objectives. Based on that decision, direct student laboratory experience. This will include—

- selecting, modifying, or developing a lesson plan which includes laboratory experience
- preparing students adequately for the laboratory experience
- securing the necessary equipment, supplies, and materials
- preparing the laboratory facility
- preparing any instruction sheets needed to guide students through the laboratory experience
- guiding the student laboratory experience
- evaluating the student laboratory experience

NOTE: Your resource person may want you to submit your written lesson plan to him/her for evaluation before you present your lesson. It may be helpful for your resource person to use the TPAF from Module B–4, *Develop a Lesson Plan*, to guide his/her evaluation.

Arrange in advance to have your resource person observe your performance in directing student laboratory experience.

Your total competency will be assessed by your resource person, using the Teacher Performance Assessment Form, pp. 53–54.

Based upon the criteria specified in this assessment instrument, your resource person will determine whether you are competent in directing student laboratory experience.

* For a definition of "actual school situation," see the inside back cover.

NOTES

TEACHER PERFORMANCE ASSESSMENT FORM

Direct Student Laboratory Experience (C–7)

Name _____

Date _____

Resource Person _____

Directions: Indicate the level of the teacher's accomplishment by placing an X in the appropriate box under the LEVEL OF PERFORMANCE heading. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

	LEVEL OF PERFORMANCE					
	N/A	None	Poor	Fair	Good	Excellent
In directing student laboratory experience, the teacher:						
1. provided the appropriate kind and amount of direction required by the students in his/her class	☐	☐	☐	☐	☐	☐
2. prepared the class adequately for the laboratory experience through one or more of the following techniques:						
a. formal instruction (e.g., illustrated talks, demonstrations, etc.)	☐	☐	☐	☐	☐	☐
b. job sheets	☐	☐	☐	☐	☐	☐
c. operation sheets	☐	☐	☐	☐	☐	☐
d. information sheets	☐	☐	☐	☐	☐	☐
e. student-made work plans	☐	☐	☐	☐	☐	☐
f. other resources	☐	☐	☐	☐	☐	☐
3. ensured that all necessary supplies, equipment, and resources were available when needed	☐	☐	☐	☐	☐	☐
4. provided time for discussion and encouraged questions	☐	☐	☐	☐	☐	☐
5. provided for individual and small-group activities as appropriate	☐	☐	☐	☐	☐	☐
6. made provision for students who finished early to continue on to other tasks	☐	☐	☐	☐	☐	☐
7. circulated among the work stations during the laboratory session to accomplish the following:						
a. visiting every student	☐	☐	☐	☐	☐	☐
b. providing appropriate types and degrees of assistance	☐	☐	☐	☐	☐	☐
c. giving reinforcement	☐	☐	☐	☐	☐	☐
d. providing feedback on performance	☐	☐	☐	☐	☐	☐

	N/A	None	Poor	Fair	Good	Excellent
8. managed the laboratory situation, showing evidence of being aware of all the students' activities throughout the laboratory	☐	☐	☐	☐	☐	☐
9. evaluated the students' performance on the basis of the information, operation, and/or job sheet requirements	☐	☐	☐	☐	☐	☐
In preparing any instruction (job, information, and operation) sheets for student use in the laboratory work, the teacher accomplished the following:						
10. the instruction sheets were developed on the basis of the degree of experience or skill possessed by the students	☐	☐	☐	☐	☐	☐
11. the directions were clear, accurate, and explicit	☐	☐	☐	☐	☐	☐
12. the directions were supplemented with clear sketches, illustrations, or diagrams	☐	☐	☐	☐	☐	☐
13. all key procedural steps involved in performing the operation/job were listed in the proper order	☐	☐	☐	☐	☐	☐
14. the correct occupational and technical terminology was used	☐	☐	☐	☐	☐	☐
15. critical points in the operation/job were noted	☐	☐	☐	☐	☐	☐
16. safety precautions to be observed were indicated	☐	☐	☐	☐	☐	☐
17. accepted quality standards for the operation/job were specified	☐	☐	☐	☐	☐	☐
18. the instruction sheet layout, drawings, and reproduction were attractive and legible	☐	☐	☐	☐	☐	☐
19. the instruction sheet content was directly related to the objectives of the lesson	☐	☐	☐	☐	☐	☐
20. the instruction sheet facts and data were current and accurate	☐	☐	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive N/A, GOOD, or EXCELLENT responses. If any item receives a NONE, POOR, or FAIR response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

NOTES

NOTES

ABOUT USING THE CENTER'S PBTE MODULES

Organization

Each module is designed to help you gain competency in a particular skill area considered important to teaching success. A module is made up of a series of learning experiences, some providing background information, some providing practice experiences, and others combining these two functions. Completing these experiences should enable you to achieve the **terminal** objective in the final learning experience. The final experience in each module always requires you to demonstrate the skill in an actual school situation when you are an intern, a student teacher, or an inservice teacher.

Procedures

Modules are designed to allow you to individualize your teacher education program. You need to take only those modules covering skills which you do not already possess. Similarly, you need not complete any learning experience within a module if you already have the skill needed to complete it. Therefore, before taking any module, you should carefully review (1) the Introduction, (2) the Objectives listed on p. 4, (3) the Overviews preceding each learning experience, and (4) the Final Experience. After comparing your present needs and competencies with the information you have read in these sections, you should be ready to make one of the following decisions:

- that you do not have the competencies indicated, and should complete the entire module
- that you are competent in one or more of the enabling objectives leading to the final learning experience, and thus can omit that (those) learning experience(s)
- that you are already competent in this area, and ready to complete the final learning experience in order to "test out"
- that the module is inappropriate to your needs at this time

When you are ready to take the final learning experience and have access to an actual school situation, make the necessary arrangements with your resource person. If you do not complete the final experience successfully, meet with your resource person and arrange (1) to repeat the experience, or (2) complete (or review) previous sections of the module or other related activities suggested by your resource person before attempting to repeat the final experience.

Options for recycling are also available in each of the learning experiences preceding the final experience. Any time you do not meet the minimum level of performance required to meet an objective, you and your resource person may meet to select activities to help you reach competency. This could involve (1) completing parts of the module previously skipped; (2) repeating activities; (3) reading supplementary resources or completing additional activities suggested by the resource person; (4) designing your own learning experience; or (5) completing some other activity suggested by you or your resource person.

Terminology

Actual School Situation . . . refers to a situation in which you are actually working with, and responsible for, secondary or post-secondary vocational students in a real school. An intern, a student teacher, or an inservice teacher would be functioning in an actual school situation. If you do not have access to an actual school situation when you are taking the module, you can complete the module up to the final learning experience. You would then do the final learning experience later; i.e., when you have access to an actual school situation.

Alternate Activity or Feedback . . . refers to an item or feedback device which may **substitute** for required items which, due to special circumstances, you are unable to complete.

Occupational Specialty . . . refers to a specific area of preparation within a vocational service area (e.g., the service area Trade and Industrial Education includes occupational specialties such as automobile mechanics, welding, and electricity).

Optional Activity or Feedback . . . refers to an item which is not required, but which is designed to **supplement** and enrich the required items in a learning experience.

Resource Person . . . refers to the person in charge of your educational program; the professor, instructor, administrator, supervisor, or cooperating/supervising/classroom teacher who is guiding you in taking this module.

Student . . . refers to the person who is enrolled and receiving instruction in a secondary or post-secondary educational institution.

Vocational Service Area . . . refers to a major vocational field: agricultural education, business and office education, distributive education, health occupations education, home economics education, industrial arts education, technical education, or trade and industrial education.

You or the Teacher . . . refers to the person who is taking the module.

Levels of Performance for Final Assessment

N/A . . . The criterion was not met because it was **not applicable** to the situation.
None . . . **No attempt** was made to meet the criterion, although it was relevent.
Poor . . . The teacher is unable to perform this skill or has only **very limited ability** to perform it.
Fair . . . The teacher is unable to perform this skill in an acceptable manner, but has **some ability** to perform it.
Good . . . The teacher is able to perform this skill in an **effective** manner.
Excellent . . . The teacher is able to perform this skill in a **very effective** manner.

Titles of The Center's Performance-Based Teacher Education Modules

Category A: Program Planning, Development, and Evaluation

- A-1 Prepare for a Community Survey
- A-2 Conduct a Community Survey
- A-3 Report the Findings of a Community Survey
- A-4 Organize an Occupational Advisory Committee
- A-5 Maintain an Occupational Advisory Committee
- A-6 Develop Program Goals and Objectives
- A-7 Conduct an Occupational Analysis
- A-8 Develop a Course of Study
- A-9 Develop Long-Range Program Plans
- A-10 Conduct a Student Follow-Up Study
- A-11 Evaluate Your Vocational Program

Category B: Instructional Planning

- B-1 Determine Needs and Interests of Students
- B-2 Develop Student Performance Objectives
- B-3 Develop a Unit of Instruction
- B-4 Develop a Lesson Plan
- B-5 Select Student Instructional Materials
- B-6 Prepare Teacher-Made Instructional Materials

Category C: Instructional Execution

- C-1 Direct Field Trips
- C-2 Conduct Group Discussions, Panel Discussions, and Symposiums
- C-3 Employ Brainstorming, Buzz Group, and Question Box Techniques
- C-4 Direct Students in Instructing Other Students
- C-5 Employ Simulation Techniques
- C-6 Guide Student Study
- C-7 Direct Student Laboratory Experience
- C-8 Direct Students in Applying Problem-Solving Techniques
- C-9 Employ the Project Method
- C-10 Introduce a Lesson
- C-11 Summarize a Lesson
- C-12 Employ Oral Questioning Techniques
- C-13 Employ Reinforcement Techniques
- C-14 Provide Instruction for Slower and More Capable Learners
- C-15 Present an Illustrated Talk
- C-16 Demonstrate a Manipulative Skill
- C-17 Demonstrate a Concept or Principle
- C-18 Individualize Instruction
- C-19 Employ the Team Teaching Approach
- C-20 Use Subject Matter Experts to Present Information
- C-21 Prepare Bulletin Boards and Exhibits
- C-22 Present Information with Models, Real Objects, and Flannel Boards
- C-23 Present Information with Overhead and Opaque Materials
- C-24 Present Information with Filmstrips and Slides
- C-25 Present Information with Films
- C-26 Present Information with Audio Recordings
- C-27 Present Information with Televised and Videotaped Materials
- C-28 Employ Programmed Instruction
- C-29 Present Information with the Chalkboard and Flip Chart

Category D: Instructional Evaluation

- D-1 Establish Student Performance Criteria
- D-2 Assess Student Performance: Knowledge
- D-3 Assess Student Performance: Attitudes
- D-4 Assess Student Performance: Skills
- D-5 Determine Student Grades
- D-6 Evaluate Your Instructional Effectiveness

Category E: Instructional Management

- E-1 Project Instructional Resource Needs
- E-2 Manage Your Budgeting and Reporting Responsibilities
- E-3 Arrange for Improvement of Your Vocational Facilities
- E-4 Maintain a Filing System
- E-5 Provide for Student Safety
- E-6 Provide for the First Aid Needs of Students
- E-7 Assist Students in Developing Self-Discipline
- E-8 Organize the Vocational Laboratory
- E-9 Manage the Vocational Laboratory

Category F: Guidance

- F-1 Gather Student Data Using Formal Data-Collection Techniques
- F-2 Gather Student Data Through Personal Contacts
- F-3 Use Conferences to Help Meet Student Needs
- F-4 Provide Information on Educational and Career Opportunities
- F-5 Assist Students in Applying for Employment or Further Education

Category G: School-Community Relations

- G-1 Develop a School-Community Relations Plan for Your Vocational Program
- G-2 Give Presentations to Promote Your Vocational Program
- G-3 Develop Brochures to Promote Your Vocational Program
- G-4 Prepare Displays to Promote Your Vocational Program
- G-5 Prepare News Releases and Articles Concerning Your Vocational Program
- G-6 Arrange for Television and Radio Presentations Concerning Your Vocational Program
- G-7 Conduct an Open House
- G-8 Work with Members of the Community
- G-9 Work with State and Local Educators
- G-10 Obtain Feedback about Your Vocational Program

Category H: Student Vocational Organization

- H-1 Develop a Personal Philosophy Concerning Student Vocational Organizations
- H-2 Establish a Student Vocational Organization
- H-3 Prepare Student Vocational Organization Members for Leadership Roles
- H-4 Assist Student Vocational Organization Members in Developing and Financing a Yearly Program of Activities
- H-5 Supervise Activities of the Student Vocational Organization
- H-6 Guide Participation in Student Vocational Organization Contests

Category I: Professional Role and Development

- I-1 Keep Up-to-Date Professionally
- I-2 Serve Your Teaching Profession
- I-3 Develop an Active Personal Philosophy of Education
- I-4 Serve the School and Community
- I-5 Obtain a Suitable Teaching Position
- I-6 Provide Laboratory Experiences for Prospective Teachers
- I-7 Plan the Student Teaching Experience
- I-8 Supervise Student Teachers

Category J: Coordination of Cooperative Education

- J-1 Establish Guidelines for Your Cooperative Vocational Program
- J-2 Manage the Attendance, Transfers, and Terminations of Co-Op Students
- J-3 Enroll Students in Your Co-Op Program
- J-4 Secure Training Stations for Your Co-Op Program
- J-5 Place Co-Op Students on the Job
- J-6 Develop the Training Ability of On-the-Job Instructors
- J-7 Coordinate On-the-Job Instruction
- J-8 Evaluate Co-Op Students' On-the-Job Performance
- J-9 Prepare for Students' Related Instruction
- J-10 Supervise an Employer-Employee Appreciation Event

RELATED PUBLICATIONS

- Student Guide to Using Performance-Based Teacher Education Materials
- Resource Person Guide to Using Performance-Based Teacher Education Materials
- Guide to the Implementation of Performance-Based Teacher Education

For information regarding availability and prices of these materials contact—

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